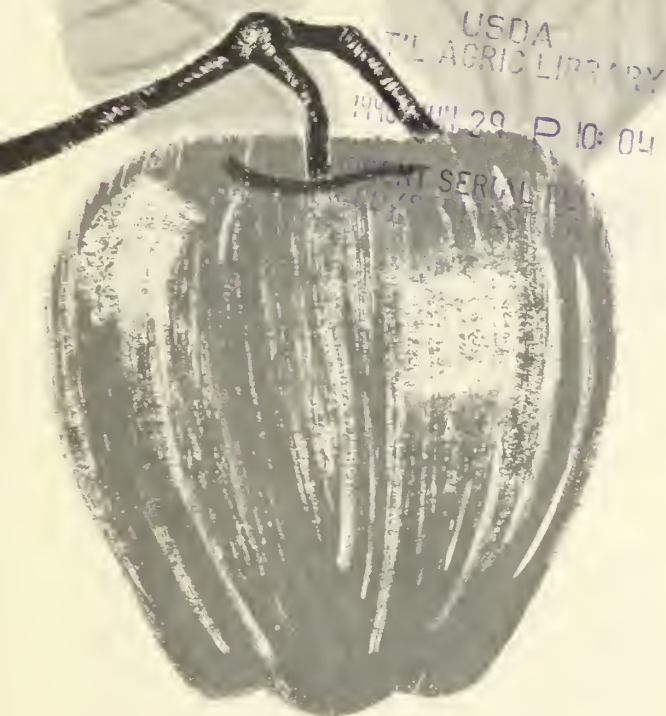


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APPLE BITTER ROT

LEAFLET NO. 406

U.S. DEPARTMENT OF AGRICULTURE

APPLE BITTER ROT

Prepared by
Crops Research Division
Agricultural Research Service

Apple bitter rot is a fungus disease that severely damages the fruit. It is a warm-weather, midsummer disease, mainly spread by rain and insects. Periods of rainy weather with temperatures between 70° and 80° F. favor growth of the fungus.

The disease is most prevalent in the South, but occasionally occurs in northern orchards. It may also attack cherries, pears, quinces, and peaches.

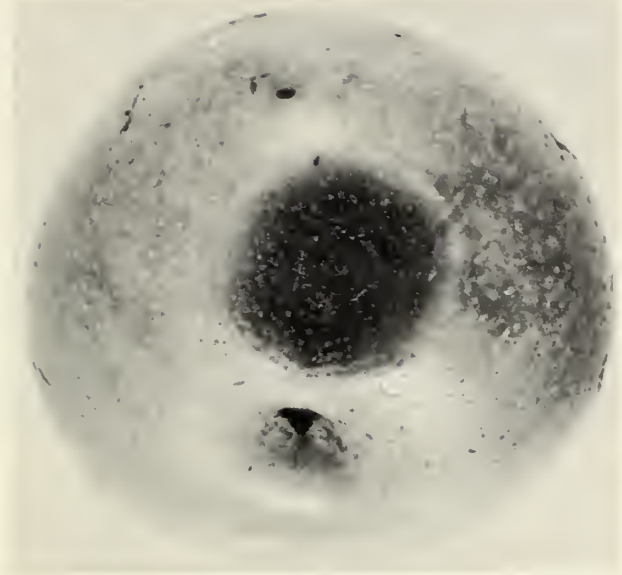
Control measures are good orchard sanitation and proper application of fungicides.

Varieties' Susceptibility

Apple varieties vary considerably in susceptibility to bitter rot. Golden Delicious, Jonathan, Yellow Newtown, Northwestern Greening, and Grimes Golden are more susceptible than Rome Beauty, Stayman Winesap, Delicious, York Imperial, and Winesap. Any variety, however, may be seriously affected in hot, rainy weather. Infection largely depends on climatic conditions and nearness to sources of infection.

Description and Damage

The fungus penetrates the uninjured skin of the apple. First signs of the disease are small, light-brown circular spots under the skin. When the spots are about one-half inch in diameter, the skin becomes depressed, and concentric rings of small sticky beads of spores break through it. At first the spore masses are pink; later they turn dark brown or black. Circles of spore masses are a distinguishing symptom of the disease. (Black rot, a fungus disease sometimes confused with bitter rot, does not produce these rings of spores.)



BN 28990

Bitter-rot infected apple showing spore rings.

In the early stages of the disease, the rotted flesh is watery (another difference from black rot) and the decayed areas are cone shaped with the cone tips pointed toward the seed cavity. As the fungus continues to grow, the decayed areas enlarge, lose their cone shape, and eventually involve the whole apple.

Infected apples may have as many as 500 or 1,000 spots. When the spots are numerous the individual spots remains small and blister-like. This gives the apple a peculiar peppered appearance.

Overwintering of the Fungus

Most of the infected apples drop to the ground. The few that remain on the trees eventually shrivel into hard masses called mummies. The fungus remain alive in these mummies until the following year and then produce spores to infect the new crop of fruit.

The fungus may also overwinter in cankered or dead parts of the tree. Once established in a twig or branch, it may persist there for several years, infecting each new crop. Twigs

and branches weakened or killed by low temperature or disease (such as fire blight or black rot) are favored invasion spots.

First appearance of the disease each season may be on fruit immediately below infected twigs, branches, and mummies. The fruit becomes infected by spores carried by rain water.

Control

First eliminate the possible sources of infection. Remove mummies, cankered areas, and dead twigs and branches. At times, outbreaks of bitter rot can be traced to a few infected trees of a susceptible variety remaining from a previous planting. Remove these trees. The value of the fruit they produce may be less than the losses they cause as sources of bitter-rot infection.

Follow with a regular spray program. Make the first application 2 weeks after petal fall—before any infections appear on the fruit. (Bitter rot rarely appears before the middle of June.) Spray 3 or 4 more times at 2-week intervals.

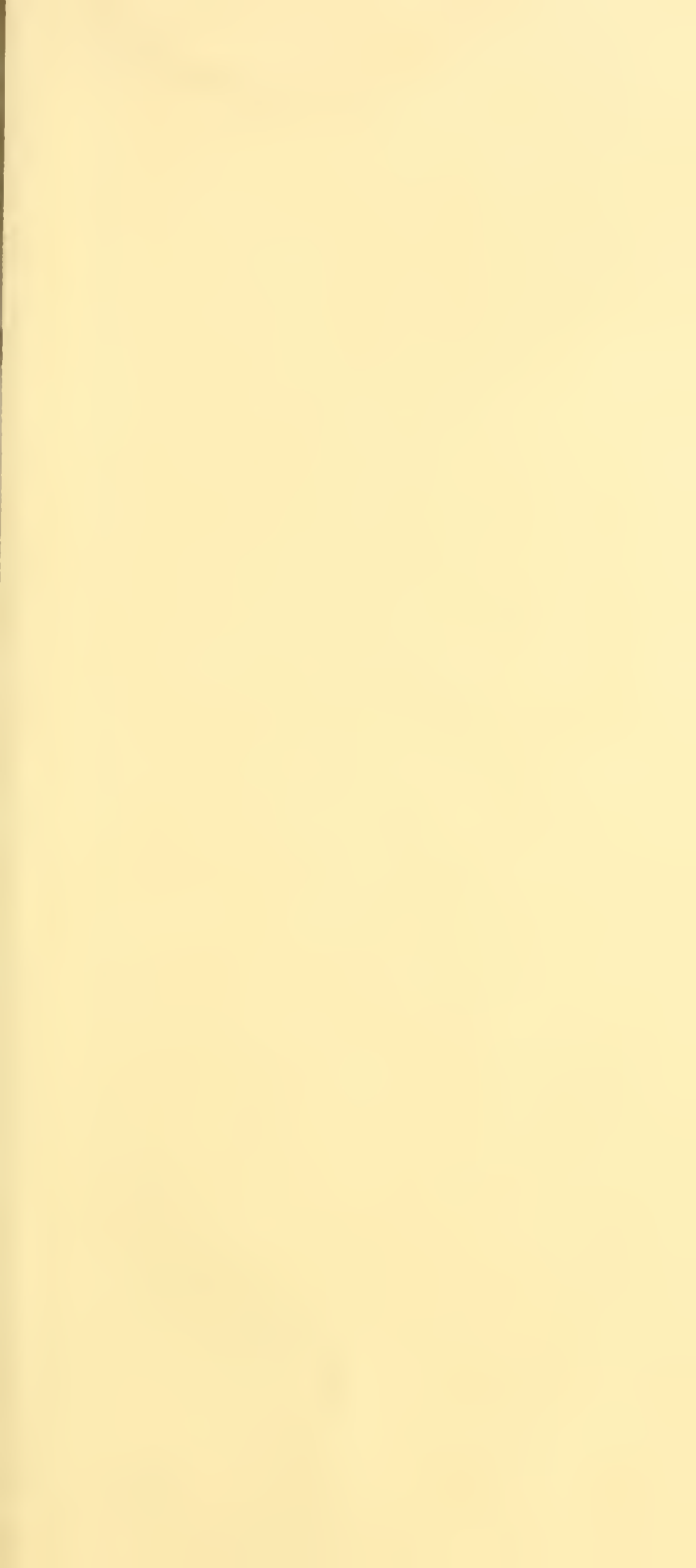
For the spray, use one of the following, per 100 gallons of water:

- 2 pounds of 50 percent captan (1 pound of active ingredient).
- 2 to 3 pounds of 76 percent ferbam (1.5 to 2.3 pounds of active ingredient).
- $\frac{3}{4}$ pound of 50 percent dichlone.

The dichlone spray is very effective, but may cause leaf spotting in hot weather.

Spray at a rate of not more than 500 gallons per acre. This will keep the residue within the established tolerance. Do not spray beyond the period recommended on the fungicide container label unless necessary to control the fungus.

In orchards where the entire crop has been ruined for several years, it may be necessary to start spraying earlier in the season and to spray every 2 weeks until the fungus is under control.





BN 28989

Apple infected with bitter-rot spores from mummy above.

Then the fruit must be washed or brushed thoroughly to remove all residue before it is offered for sale or used at home.

Precautions

Fungicides used improperly can be injurious to man and animals. Use them only when needed and handle with care. Follow the directions and precautions on the labels.

Some States have special restrictions on the use of certain fungicides. Before applying fungicides, check State and local regulations.

Keep fungicides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and animals cannot reach them. Promptly dispose of empty fungicide containers; do not use for any other purpose.

When handling a fungicide, wear clean, dry clothing.

Avoid repeated or prolonged contact of fungicide with your skin.

Wear protective clothing and equipment if specified on the container label. Avoid prolonged inhalation of fungicide dusts or mists.

Avoid spilling a fungicide concentrate on your skin, and keep it out of your eyes, nose,

and mouth. If you get a concentrate on your skin, wash it off immediately with soap and water. If you spill a concentrate on your clothing, remove the clothing immediately and wash the skin thoroughly. Launder the clothing before wearing it again.

After handling a fungicide, do not eat, drink, or smoke until you have washed your hands and face. Wash any exposed skin immediately after applying a fungicide.

Avoid drift of fungicide to nearby wildlife habitats, bee yards, crops, or livestock. Do not apply fungicides under conditions favoring drift from the area to be treated.

Many fungicides are highly toxic to fish and aquatic animals. Keep fungicides out of all water sources such as ponds, streams, and wells. Do not clean spraying equipment or dump excess spray material near such water.

Do not apply fungicides to plants during hours when honey bees and other pollinating insects are visiting them.

Have empty fungicide containers buried at a sanitary land-fill dump, or crush and bury them at least 18 inches deep in a level, isolated place where they will not contaminate water supplies. If you have trash-collection service, thoroughly wrap small containers in several layers of newspaper and place them in the trash can.

It is difficult to remove all traces of herbicides from equipment. For this reason, do not use the same equipment for applying herbicides that you use for insecticides and fungicides.



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